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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,790	02/24/2004	Masaaki Iijima	Q78714	2176

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EXAMINER

VERDIER, CHRISTOPHER M

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/784,790

Applicant(s)

IIJIMA ET AL.

Examiner

Christopher Verdier

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2-24-04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Specification

The abstract of the disclosure is objected to because in line 15, -- is -- should be inserted after "portion". Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informality: Appropriate correction is required.

In paragraph 22, last line, "12B" should be changed to -- 12A --.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 in view of Kato 5,372,475. Ito (figures 2-8) discloses a turbine fuel pump substantially as claimed, including a cylindrical casing 23, an electric motor 25 accommodated in the casing, a pump housing 26 mounted into the casing, the pump housing including a suction port 35, a discharge port 36 and a fuel path connected to the suction and discharge ports, and an impeller 28 disposed within the pump housing and driven around an axis in a rotational direction R by the electric motor, the impeller including a generally annular body and a plurality of vanes 39 projecting radially outwardly from the body and disposed within the fuel path, each of the vanes being formed into a generally rectangular plate including a tip end face 39c that extends circumferentially to define an outer peripheral surface of the impeller, a front face 39a located on a forward side in the rotational direction of the impeller and having a root portion (at the radially inner periphery of 39a) located on a side of the body of the impeller and a tip end portion (at the radially outer periphery of 39a) located on a side of an outer periphery of the impeller, the front face being curved such that the tip end portion is positioned forwardly in the rotational direction R of the impeller relative to the root portion, and a rear face 39b located on a rearward side in the rotational direction of the impeller.

However, Ito does not disclose a chamfer portion disposed between the tip end face and the tip end portion of the front face, with the chamfer being formed by cutting a corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in

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section perpendicular to the axis, with the chamfer portion being inclined relative to a plane containing the axis.

Kato (figures 18-19) shows a turbine fuel pump having an impeller with vanes 323 formed as generally rectangular plates and each having a chamfer portion 3231b disposed between a tip end face 3230 and an unnumbered tip end portion of a front face (unnumbered, but the leading edge of the vane as seen in the direction of rotation of the impeller), with the chamfer being a corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in section perpendicular to a rotation axis axis, with the chamfer portion being inclined relative to a plane containing the axis, for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the turbine fuel pump of Ito such that a chamfer portion is disposed between the tip end face and the tip end portion of the front face, with the chamfer being formed by a corner between the tip end face and the tip end portion of the front face, with the chamfer portion having a uniform length between the tip end face and the tip end portion of the front face as measured in section perpendicular to the axis, with the chamfer portion being inclined relative to a plane containing the axis, as taught by Kato, for the purpose of reducing the loss of vortex fuel currents, thus raising pump efficiency.

Although the vanes of Kato are not formed such that the tip end portion is positioned forwardly in the rotational direction of the impeller relative to the root portion, one of ordinary skill in the art would have recognized that the teachings of Kato of chamfering the tip portion are applicable to both straight and curved vanes, since the chamfering solves the problem of reducing the loss of vortex fuel currents, which is present in turbine pumps having both straight and curved vanes.

The recitation in claim 2, line 2 that the chamfer portion is formed by "cutting" a corner between the tip end face and the tip end portion of the front face is a product-by-process limitation. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product-by-process claim does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). The chamfer recited in claim 2 is the same as the chamfer 3231b of Kato. Alternately, Official Notice is taken that cutting is a well-known manner of forming chamfers in surfaces, for the purpose of easily and economically forming the chamfer, and it would have been obvious to a person having ordinary skill in the art to form the chamfer by cutting, for the purpose of easily and economically forming the chamfer.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito 5,407,318 and Kato 5,372,475 as applied to claim 3 above, and further in view of Yu 5,762,469. The modified

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turbine fuel pump of Ito shows all of the claimed subject matter except for the uniform length of the chamfer portion being in the range of 0.05 to 0.15mm.

Yu (figures 2-3) teaches that a turbine fuel pump may have impeller vanes 54 with a chamfered tip portion 70 that has a distance d of 0.1-0.6 mm, and an angle θ of 5-30 degrees. Forming a right triangle, the length of the chamfered portion is $(0.1-0.6)/\cos(5-30 \text{ degrees})$. The length of the chamfered portion, for example, is $0.1/\cos 30 \text{ degrees}$, which is 0.115mm, as a value which one would consider to reduce turbulence and cavitation.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified turbine fuel pump of Ito such that the uniform length of the chamfer portion is 0.115mm, as taught by Yu as a value which one would consider to reduce turbulence and cavitation.

Although the vanes of Yu are not formed such that the tip end portion is positioned forwardly in the rotational direction of the impeller relative to the root portion, one of ordinary skill in the art would have recognized that the teachings of Yu of the length of the chamfered tip portion are applicable to both straight and curved vanes, since the chamfering solves the problem of reducing turbulence and cavitation, which is present in turbine pumps having both straight and curved vanes.

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Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Brady is cited to show a regenerative pump with impeller vanes curved in the direction of rotation.

Ross is cited to show a turbine fuel pump with vanes having a chamfer on the trailing edge.

Ito '809 is cited to show a fuel pump having vanes with chamfered portions on the leading and trailing edges.

Motojima is cited to show a turbine fuel pump with vanes having chamfered trailing edges.

Allowable Subject Matter

Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.V.
February 20, 2005


Christopher Verdier
Primary Examiner
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